

## REMARKS

Applicants appreciate the courtesies extended by Examiners David Wu and Henry Hu during an interview on December 4, 2003 with Applicants' attorney, Jeffrey A. Wolfson. The comments appearing herein summarize, and are substantially in accord with, those presented and discussed during the interview.

Claims 1-21, as amended, and new claim 22 are pending in this application for the Examiner's review and consideration. Several amendments made to respond to the objections in the Office Action are discussed further below. Each of independent claims 1, 4, 8, and 15 has been amended to recite that the polyolefin blend comprises a non-functionalized homopolymer or copolymer of propylene, and either (a) a copolymer of ethylene and an alpha-olefin with an optional diene; or (b) a styrene copolymer of ethylene or propylene; or a mixture thereof (*See, e.g.*, Specification at page 9, lines 16-21). The "non-functionalized" language makes clear that the "functionalized" polyolefin is functionalized, while the other polyolefin is non-functionalized as now more clearly recited (*See, e.g.*, Specification at page 13, lines 9-24). Claim 12 has been amended to further recite a preferred embodiment where the *alpha*-olefin comprises octene (*See, e.g.*, Examples 6-9). New claim 22 recites a preferred clay material, which is CLOISITE 15A (*See, e.g.*, Examples 4-5). A specification sheet regarding CLOISITE 15A clay is attached hereto. Thus, it is believed that no new matter has been introduced.

Initially, the specification was objected to for a typographical error at page 11, line 11 of the Specification, as noted on page 2 of the Office Action. Applicants have amended the specification to correct this. The Drawings were also objected to by the Draftsperson for several informalities, and a Submission of Formal Drawings to submit corrected Formal Drawings of FIGS. 1, 3a, 3b, and 4 is submitted herewith to attend to these objections. Also, claims 4, 8, 11, and 15 were objected to for various informalities. Claims 4, 8, and 15 were objected to as to the ratio of melt strengths, and Applicants have amended claims 4, 8, and 15 as suggested by the Examiner. Claim 11 is objected to as potentially being confusing. While Applicants believe that claim 11 is fully supported at page 9, lines 23-24, Applicants have amended to clarify the language of concern to the Examiner to expedite prosecution of the above-noted application. Claim 8 was also objected to as using inconsistent terminology; Applicants have amended this to recite optional additive components as requested. The claim is still open to additional materials by virtue of its transition term "comprising." These amendments are merely for clarification purposes and do not modify the scope of these claims—either to enlarge or to narrow the claims. As such,

Applicants believe that all objections to the Specification, Drawings, and claims have been overcome, and respectfully request reconsideration and withdrawal of the objections on pages 2-4 of the Office Action.

Claim 1 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite since the recitation of "polyolefin blend" is alleged to be vague and indefinite. The polyolefin blend is different from the polyolefin material of the polyolefin/clay masterbatch. This has been clarified by the amendment to claim 1 reciting that the polyolefin blend comprises certain materials. As such, this rejection under 35 U.S.C. § 112, second paragraph, is believed to have been overcome, and Applicants respectfully request reconsideration and withdrawal thereof.

Claims 1-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over, U.S. Patent No. 5,973,053 to Usuki et al. ("Usuki") on pages 7-9 of the Office Action. The Office Action states that Usuki teaches a method of producing a composite clay material and its use in blending organo onium ions with clay minerals, where one main guest molecule is a polar functional group interlayered in the clay, as well as an alternate method using a second guest molecule with no polar group with a molecular length not less than organo onium ions. Also, Usuki is stated to disclose combining such clay composites with rubber material (Abstract lines 23-24; Col. 30, lines 26-29 and 44-52). The Examiner also states that the additional components of claim 12 are taught by Usuki at Col. 25, lines 25-30 and Col. 27, lines 64-66. Also, the position of the Office Action is that various independent and dependent claims are rejected for anticipation/obviousness since the reference is silent on both the melt strength property and shear viscosity presently recited.

Usuki teaches rubber materials, such as a thermoset rubber for a tire innerliner (See Example 17, lines 20-36). Usuki fails to teach propylene homo- or co-polymers or the other materials recited by the present invention. Moreover, the thermoset materials cure and are significantly different from the materials recited in the polyolefin blend, such that one of ordinary skill in the art would not have been motivated to pick and choose various features from Usuki to arrive at the present invention. The independent claims recite that the polyolefin blend comprises a homopolymer or copolymer of propylene, and either (a) copolymer of ethylene and an alpha-olefin with an optional diene; or (b) a styrene copolymer of ethylene or propylene; or a mixture thereof, which Usuki fails to disclose or even suggest.

Moreover, surprising and unexpected benefits of the present invention were obtained in the form of high viscosity under low shear rates of the polyolefin/clay

nanocomposites of the claimed invention. These benefits ultimately provided a solution to the lower melt strengths that existed in various prior art materials of the cited references, while Usuki included rubber that would have a completely different effect compared to the polymeric materials presently recited in the polyolefin blend. Thus, Applicants respectfully request that the rejections under 35 U.S.C. § 102(b) and 103(a) be reconsidered and withdrawn as to all claims.

Claim 21 was rejected under 35 U.S.C. § 103(a) as being obvious over Usuki in view of U.S. Patent No. 4,810,734 to Kawasumi et al. ("Kawasumi") on pages 9-10 of the Office Action. The Office Action states that Usuki does not disclose a protonated amino acid swelling agent, but that Kawasumi teaches that such materials can be used as a swelling agent in composite clay materials. Claim 21 is a dependent claim and, although separately patentable, it is also patentable through its dependency on patentable claim 1 as discussed above. Additionally, one of ordinary skill in the art would not have been motivated to take a swelling agent that works in solvents as taught by Kawasumi (Col. 4, lines 20-26) and apply it to the presently recited invention. Moreover, the references themselves provide no reasonable expectation of success in so doing. As such, claim 21 is believed to be patentable and Applicants respectfully request that the rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

Claims 1-21 were rejected under 35 U.S.C. § 102(e) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over, over U.S. Patent No. 6,462,122 to Qian et al. ("Qian") on pages 10-12 of the Office Action. The Office Action states that Qian teaches a layered silicate material, a matrix polymer of polyolefin and maleic anhydride-modified polyolefin, and coupling agents such as organo onium ions that are useful in blending non-polar or low-polarity oligomers or polymers with clay minerals (Col. 2, line 24 to Col. 3, line 40). The Office Action concedes that the reference is silent as to melt strength, but states that the burden is on Applicants to show this feature is not present otherwise in the compositions of Qian, which are alleged to be substantially the same as Examples 1-12 and controls of the invention.

On the contrary, Qian teaches that functionalized polyolefin, *i.e.*, maleic-anhydride-modified polyolefin, must be used in forming both the masterbatch and the final polymer (*See, e.g.*, Examples 3-4 and 6). The final polymer is stated to include both a matrix polymer and an oligomer or polymer of a maleic anhydride-modified polyolefin, preferably propylene (Col. 8, lines 25-29). The present invention has been amended to recite that the polyolefin blend includes a non-functionalized material, *i.e.*, propylene, to distinguish that the

present invention only requires a functionalized polymer in forming the masterbatch. In fact, the inventors discovered that inclusion of a functionalized polymer in forming the final blend or article can undesirably result in unpredictable blend properties.

Qian cannot teach the surprising and unexpected melt strength of the present invention since it includes different polymer materials. Thus, the Office Action is incorrect in stating that the melt strength would be inherently the same as that presently claimed. The present invention demonstrates a surprising high viscosity under low shear rates, *i.e.*, melt strength (*See, e.g.*, Specification at page 8, line 26 to page 9, line 4). For these reasons, Qian does not disclose or suggest the claimed invention.

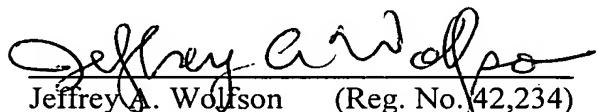
Moreover, new claim 22 recites a specific preferred class of clay materials, *i.e.*, CLOISITE 15A, which is disclosed by name in the specification. The claimed clay provided surprising and unexpected benefits in the shear and flex modulus compared to conventional clays like those taught by Qian (*See, e.g.*, Example 3 in Table I). Qian did not motivate one of ordinary skill in the art to use a CLOISITE type material, and one of ordinary skill in the art would not have reasonably expected to successfully achieve the high viscosity under low shear rates attained by the present invention. Thus, Applicants respectfully request that the rejections under 35 U.S.C. § 102(e) and 103(a) be reconsidered and withdrawn, since no *prima facie* case of obviousness has been stated.

In view of the above, all rejections have been overcome and should be withdrawn. Accordingly, the entire application is believed to be in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of the claims.

Respectfully submitted,

Dec. 8, 2003

Date

  
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## CLOISITE® 15A

## TYPICAL PHYSICAL PROPERTIES BULLETIN

**Description:**

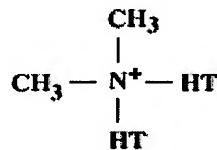
Cloisite® 15A is a natural montmorillonite modified with a quaternary ammonium salt.

**Designed Used:**

Cloisite® 15A is an additive for plastics to improve various plastic physical properties, such as reinforcement, HDT, CLTE and barrier.

**Typical Properties:**

Treatment/Properties:	Organic Modifier (1)	Modifier Concentration	% Moisture	% Weight Loss on Ignition
Cloisite® 15A	2M2HT	125 meq/100g clay	< 2%	43%



Where HT is Hydrogenated Tallow (~65% C18; ~30% C16; ~5% C14)  
Anion: Chloride

(1) 2M2HT: dimethyl, dihydrogenatedtallow, quaternary ammonium

Typical Dry Particle Sizes: (microns, by volume)

10% less than:	50% less than:	90% less than:
2 $\mu$	6 $\mu$	13 $\mu$

Color: Off White

Density:

Loose Bulk, lbs/ft <sup>3</sup>	Packed Bulk, lbs/ft <sup>3</sup>	Specific Gravity, g/cc
10.79	18.64	1.66

X Ray Results:  $d_{001} = 31.5\text{\AA}$

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